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Claims

1. Shaft locking device for a spindle (1, 1a, 1b) of a motor-driven, hand-guided work tool, particularly, a drill or hammer drill, comprising a driven member (4, 4a, 4b) that is fixedly connected to the spindle (1, 1a, 1b) and can be engaged in both rotating directions of the spindle (1, 1a, 1b) by locking members (22) of a freewheel (28) by a ring (23), fixedly connected to the housing, further comprising a drive member (3, 3a, 3b) which is coaxially arranged to the spindle (1, 1a, 1b) and is provided with unlocking members (10, 10a, 10b) which co-operate with the locking members and release the locking members when the driving member (3, 3a, 3b) is driven such that the driven member (4, 4a, 4b) is released from the ring (23) fixedly connected to the housing and is rotatable, and further comprising torque-transmitting catch surfaces (18, 18a, 18b, 19, 19a, 19b) provided at the driven member (4, 4a, 4b) and the drive member (3, 3a, 3b) for the motor-driven drive of the spindle (1, 1a, 1b), whereby the catch surfaces (18, 18a, 18b, 19, 19a, 19b) have a larger distance from one another in neutral position of the drive member (3, 3a, 3b) than the distance provided between the unlocking member (10, 10a, 10b) and the associated locking member (22), characterized in that the drive member (3, 3a, 3b) is provided with cams (11, 11a, 11b) that are spacially separated from the unlocking member (10, 10a, 10b) and that the cams (11, 11a, 11b) penetrate into the driven

- 5 member (4, 4a, 4b), whereby the torque-transmitting catch surfaces (18, 18a, 18b, 19, 19a, 19b) are formed by cam surfaces (18, 18a, 18b) of the cams (11, 11a, 11b) and by drive surfaces (19, 19a, 19b) of catch openings (3) facing those cam surfaces (18, 18a, 18b) in the respective rotational direction.
- 10 2. Shaft locking device according to claim 1, characterized in that the spindle (1, 1a, 1b) is designed as one piece and penetrates the driven member (4, 4a, 4b) and the drive member (3, 3a, 3b), whereby the spindle (1, 1a, 1b) serves as a support for the drive member (3, 3a, 3b).
- 15 3. Shaft locking device according to one of the claims 1 or 2, characterized in that the drive member (3, 3a, 3b) is embodied as a toothed wheel (7, 7a, 7b).
4. Shaft locking device according to claim 3, characterized in that the toothed wheel (7, 7a, 7b) is provided with teeth (31) made of plastic.
- 20 5. Shaft locking device according to one of the claims 1 through 4, characterized in that the cams (11) extend axially or radially into the catch openings (30) which are embodied as ring segments (17).

6. Shaft locking device according one of the claims 1 through 4, characterized in that the cams (11a, 11b) extend axially or radially into the catch openings (30) which are embodied as radial recesses (17a, 17b).
- 5 7. Shaft locking device according to one of the claims 1 through 6, characterized in that the unlocking members (10, 10a, 10b) and the cams (11, 11a, 11b) are arranged to be concentrically to one another, whereby the unlocking elements (10, 10a, 10b) embrace the driven member (4, 4a, 4b) at a spacing.
- 10 8. Shaft locking device according to one of the claims 1 through 7, characterized in that the drive member (3, 3a, 3b) is provided with at least two pairs of symmetrically embodied unlocking members (10, 10a, 10b) and cams (11, 11a, 11b), with a pair-wise common center line (12) and an equally spaced angle between the neighboring center lines (12).
- 15 9. Shaft locking device according to one of the claims 1 through 8, characterized in that the driven member (4, 4a, 4b) is embodied as a deep-drawn sheet metal member (13) or as an extruded member (13a) or as a thick disc (13b).
- 20 10. Shaft locking device according to claim 9, characterized in that the sheet metal member (13) or the extruded member

(13a) or the disc (13b) is provided at its circumference with cams (21) for the locking members (22) of the freewheel (28).

5 11. Shaft locking device according to claims 9 or 10, characterized in that a fixedly connected driven closing ring (27, 27b) is provided with a clearance-free contact to the sheet metal member (13) or to the steel member (13b) and has axial clearance to the locking members (22) of the freewheel (28).

10 12. Shaft locking device according to claims 10 or 11, characterized in that the cams (21) and the associated locking members (22) are arranged as pairs.

15 13. Shaft locking device according to claim 12, characterized in that spring elements (24) are arranged between the locking members (22).

14. Shaft locking device according to one of the claims 1 through 13, characterized in that the cams (18, 18b) of the cams (11, 11b) are radially aligned with the drive surfaces (19, 19b) of the catch openings (30).

20 15. Shaft locking device according to one of the claims 1 through 14, characterized in that the driven member (4, 4a) is

positive-lockingly connected to the spindle (1, 1a).

16. Shaft locking device according to one of the claims 1 through 14, characterized in that the driven member (4b) is force-lockingly connected the spindle (1b).

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WHAT IS CLAIMED IS:

17. A shaft locking device for a spindle (1, 1a, 1b) of a motor-driven, hand-guided work tool, said shaft locking device comprising:

a spindle (1, 1a, 1b);

a driven member (4, 4a, 4b) fixedly connected to said spindle (1, 1a, 1b);

a freewheel (28) having locking members (22);

a ring (23), fixedly connected to a housing, wherein said locking members (22) engage said ring (23) in both rotating directions of said spindle (1, 1a, 1b);

a drive member (3, 3a, 3b) coaxially arranged to said spindle (1, 1a, 1b) and provided with unlocking members (10, 10a, 10b), wherein said unlocking members (10, 10a, 10b) co-operate with said locking members (22) in order to release said locking members (22) when said driving member (3, 3a, 3b) is driven such that said driven member (4, 4a, 4b) is released from said ring (23) and is rotatable;

said driven member (4, 4a, 4b) and said drive member (3, 3a, 3b) having torque-transmitting catch surfaces (18, 18a, 18b, 19, 19a, 19b) for a motor-driven drive action of said spindle (1, 1a, 1b), whereby said catch surfaces (18, 18a, 18b, 19, 19a, 19b) have a larger distance from one another in a neutral position of said drive member (3, 3a, 3b) than a distance provided between said unlocking

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members (10, 10a, 10b) and respectively associated ones of said locking members (22);

said drive member (3, 3a, 3b) having cams (11, 11a, 11b) that are spacially separated from said unlocking member (10, 10a, 10b), wherein said cams (11, 11a, 11b) penetrate into said driven member (4, 4a, 4b);

said driven member (4, 4a, 4b) having catch openings (30);

wherein said torque-transmitting catch surfaces (18, 18a, 18b, 19, 19a, 19b) are formed by cam surfaces (18, 18a, 18b) of said cams (11, 11a, 11b) and by drive surfaces (19, 19a, 19b) of said catch openings (30) facing said cam surfaces (18, 18a, 18b) in a respective rotational direction of said spindle (1, 1a, 1b).

18. A shaft locking device according to claim 17, wherein said spindle (1, 1a, 1b) is a one-piece member and penetrates said driven member (4, 4a, 4b) and said drive member (3, 3a, 3b), wherein said spindle (1, 1a, 1b) serves as a support for said drive member (3, 3a, 3b).

19. A shaft locking device according to claim 17, wherein said drive member (3, 3a, 3b) is a toothed wheel (7, 7a, 7b).

20. A shaft locking device according to claim 19, wherein said toothed wheel (7, 7a, 7b) has plastic teeth (31).

21. A shaft locking device according to claim 17, wherein said cams (11) extend axially or radially into said catch openings (30)

and wherein said catch openings (30) are embodied as ring segments (17).

22. A shaft locking device according claim 17, wherein said cams (11a, 11b) extend axially or radially into said catch openings (30) and wherein said catch openings (30) are embodied as radial recesses (17a, 17b).

23. A shaft locking device according to claim 17, wherein said unlocking members (10, 10a, 10b) and the cams (11, 11a, 11b) are arranged concentrically to one another, wherein said unlocking members (10, 10a, 10b) embrace said driven member (4, 4a, 4b) at a spacing.

24. A shaft locking device according to claim 17, wherein said drive member (3, 3a, 3b) has at least two pairs of symmetrically embodied ones of said unlocking members (10, 10a, 10b) and said cams (11, 11a, 11b), wherein each one of said pairs has a common center line (12) that is positioned at an equally spaced angle to neighboring ones of said center lines (12).

25. A shaft locking device according to claim 17, wherein said driven member (4, 4a, 4b) is embodied as a deep-drawn sheet metal member (13) or as an extruded member (13a) or as a thick disc (13b).

26. A shaft locking device according to claim 25, wherein said sheet metal member (13) or said extruded member (13a) or said disc (13b) is provided with circumferential cams (21) for said locking

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